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ABSTRACT

Since schools seem to exist for the purpose of preparing students for more schooling rather than assisting youth to cope effectively with life problems, schools should be reorganized to include a large segment of practical arts experience that provides both a broadening and humanizing effect as well as to allow for the development of the individual as a self-sufficient, intelligent, and productive citizen in a highly complex, technological society. Based on this position, a developmental effort was proposed to (1) build a rationale for a practical arts component of the junior high/middle school curriculum and (2) outline a school program of practical arts related to the fields of agriculture, home and family living, health, industry, business and office, and distribution. The activities included the development of a position paper stating the underlying philosophy of practical arts education, and the projection of a detailed plan to deliver a modern practical arts program. Selected formative and summative evaluation techniques were employed to assess the adequacy of the underlying rationale for the program and of the structure of the program. Selected leaders in education assisted in this assessment. The program rationale that resulted is intended to provide a blueprint for major redesign of schooling in the United States. (Appendixes contain numerous materials, including the position paper, program objectives by area, and other related matters.) (Author/BH)

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ED155356

Title of Project:	Conceptualization of a Practical Arts Program Component for Junior High/ Middle School Youth
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ABSTRACT

Title:	Conceptualization of a Practical Arts Program Component for Junior High/ Middle School Youth
Principal Investigator:	Willis E. Ray, Ed.D. Professor of Education The Ohio State University
Contracting Agency:	State of Ohio Department of Education Division of Vocational Education
State Funds Expended:	$ 37,279.47
Beginning and Ending Dates:	April 1, 1977 to May 31, 1978

Statement of Problem: School programs are not designed to assist youth to cope effectively with life problems. Schools seem to exist to prepare for more schooling. Schools should be reorganized to include a large segment of practical arts experience that provides both a broadening and humanizing effect as well as to allow for the development of the individual as a self-sufficient, intelligent, and productive citizen in a highly complex, technological society.

Statement of Objectives: This developmental effort proposed to (1) build a rationale for a practical arts component of the junior high/middle school curriculum, and (2) outline a school program of the practical arts related to the fields of agriculture, home and family living, health, industry, business and office, and distribution.

Description of Activities: Activities included (1) the development of a position paper stating the underlying philosophy of practical arts education, and (2) the projection of a detailed plan to deliver a modern practical arts program.

Techniques of Evaluation of Objectives: Selected formative and summative evaluation techniques were employed to assess the adequacy of the underlying rationale for the program and of the structure of the program plan as projected. Selected leaders in education assisted in this assessment.

Contribution to Education: The program rationale and plan provides a blueprint for major redesign of schooling in the United States.

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TABLE OF CONTENTS

		Page
Abstract		i
Narrative Report		1
	Statement of Problem	1
	Statement of Objectives	2
	Description of Activities	3
	Techniques of Evaluation of Objectives	5
	Contribution to Education	6
	References	9
Personnel and Facilities		10
Project Expenditures		11
Appended Items		
Appendix A	State Staff Meeting - May 1977	12
Appendix B	Campus Resource Persons	14
Appendix C	State Staff Meeting - July 1977 Evaluation of First Draft of Position Paper	16
Appendix D	First General Conference Agenda - July 1977	20
Appendix E	Participants - First General Conference - July 1977	22
Appendix F	Evaluation of Second Draft of Position Paper by Conference Participants - July 1977	25
Appendix G	State Staff Meeting - October 1977	27
Appendix H	Participants and Agenda - Second General Conference - October 1977	30
Appendix I	Evaluation of First General Conference Procedures - July 1977	35
Appendix J	Project Position Paper	37
Appendix K	Program Objectives by Area	60
Appendix L	Subject Matter Generalizations	66
Appendix M	Minimum and Optimum Staffing Patterns	72
Appendix N	Program Estimated Costs	75

NARRATIVE REPORT

Statement of Problem

Schooling in the United States has been designed principally to provide the background for more schooling of an academic nature. School programs and classroom activities have focused upon the major subject areas (disciplines) and preparation for advanced education.

The concept of education for work in the public schools has been a difficult proposition to have accepted by our tradition-bound (academic) school leadership (Barlow, 1967). Regardless, great strides have been made in the development of vocational education. This development, however, has not come about through the wholehearted support of secondary school and higher education leaders or local tax dollars. Since 1917 a federal stimulus (in the form of Vocational legislation) has been required to promote and partially support such school programs.

Almost totally ignored by the schools has been an educational program component that would provide youth with coping skills to live in our complex, technological world. For decades the concept of a practical arts program has been in a near-dormant stage. Bonser (1920) was among the early leaders who expressed the need to develop school experiences, beginning in the elementary schools, that would bridge the gap between the academic (basic) school subjects and the many technical aspects of everyday life. Mays (1948) made a case for the development of the practical arts as strong support for general and vocational education programs. Wenrich (1963) indicated that programs of a practical nature can serve youth who have not been provided with appropriate vocational education programs. Roberts (1971) has traced the origins of practical arts education to the teachings of Pestalozzi in Europe and to the manual training movement in the United States.

However, the past fifty years of educational progress in the United States have been marked by an almost complete suspension of activity which would have led to the development of a broad-based practical arts component of school programs. Standing nearly alone have been the meritorious attempts of the professional leadership in industrial arts and home economics. But school experiences reflecting only the home and industry have fallen short of providing the broad program needed.

In 1934, the Ohio Education Association and the Ohio State Department of Education sponsored a publication entitled A Prospectus for Industrial Arts in Ohio. In it the concept of the practical arts was addressed:

> Industrial Arts should first of all be thought of as one of the Practical Arts in the general scheme of education. The other Practical Arts include studies pertaining to Agriculture, Commerce, Health, and the Home. While the Practical Arts

> include an unusually significant range of subject-matter having to do with the actualities of life, they also imply a method of learning where the basic point of departure is through performance (p. 64).

Hence the practical arts approach relates both to subject matter of a practical type as well as to a method of educating youth to the underlying values of a technological society.

Children in today's schools find much of their education remote from life and living. They have claimed that schooling is not relevant. What they do learn is done in learning environments nearly devoid of practical hands-on experience and motivating, exciting activity.

Elementary schools perhaps have done the best job of relating the basic experiences in language, number, and social consciousness to the real world. Junior high schools (or middle schools) have been caught up in the traditional pattern of preparing students to be able to perform in the school "subjects" at the high school and collegiate levels.

The problem, then, is that the schools have not adequately conceptualized and formalized a program where common learnings, underlying values, coping skills, and other attitudes can be developed that would enable each student to find satisfaction in everyday life and meet the responsibilities of our fast-moving society. A practical arts program would provide both a broadening and a humanizing effect and would contribute to the development of the individual as a whole.

This report is submitted to detail a plan for the formulation of one major portion of a program at the middle/junior high school level that would lead to the redesign of education from grades 7 to 10 for children up to sixteen years of age. Such a program at that level involves two main components: (1) a social-based core program drawing upon the best of conventional school subject matter and (2) a practical arts-based core program focusing upon concepts that would provide youth with experiences for coping with problems of our technological society.

Statement of Objectives

The general goal of this study was to design a program of practical arts for pupils in grades 7-10. More specifically, the objectives of this proposed developmental effort were:

1. to build a rationale for a practical arts component of the junior high/middle school curriculum, and

2. to outline a school program of the practical arts related to the fields of agriculture, home and family living, health, industry, business and office, and distribution.

Description of Activities

This section describes the procedures used and the activities that were conducted to accomplish each of the objectives. Activities began in April of 1977 and concluded in May of 1978.

Objective One. A thorough review of literature was conducted. Some materials written prior to 1900 were considered. Statements of leaders written during the 1900-1920 period were reviewed. This period was carefully studied because it was during this time in the development of vocational education that the values of both general and specialized (vocational) applications of practical (technological) knowledge were recognized. Literature of the 1920-1950 period was studied to obtain the best arguments of progressive education, the activity movement, the unified arts movement, and life adjustment education. Contemporary literature was reviewed extensively to find fundamental arguments in building a case for the need for the practical arts.

In order to obtain additional direction, the principal investigator met with the staff of the Division of Vocational Education, State of Ohio Department of Education on May 13, 1977. The agenda and a roster of persons present at that session are presented in Appendix A.

During the May-June period of 1977, the project staff held a series of meetings with personnel on The Ohio State University campus. These meetings were held to discuss (1) the significant literature of each of the several practical arts fields and (2) to obtain points of view regarding a philosophy for a program of practical arts education. A list of these resource persons is provided in Appendix B.

A draft position paper was prepared during late May, June, and early July, 1977. A meeting with the staff of the Division of Vocational Education, State of Ohio Department of Education, was held on July 26, 1977 to review and evaluate the contents of the draft position paper. Appendix C presents the names of those persons in attendance together with an evaluation form with ratings.

In addition, the draft position paper was distributed to selected vocational, technical, and practical arts educators on the campus of The Ohio State University. Several personal conferences were held. In addition, letters indicating reactions were received and evaluated.

The first general conference was held on July 28 and 29, 1977. Twenty-two participants attended. These persons were classroom teachers, supervisors, and school administrators from selected school systems in Ohio. In addition, six state staff members were in attendance. The purpose of this conference was to present and evaluate the draft position paper. Suggestions for scheduling, staffing, and operating a practical arts program were obtained. The agenda for the

conference is presented in Appendix D. A list of the participants is provided in Appendix E. An evaluation of the position paper was completed by the participants and state staff in attendance. These data are presented in Appendix F.

Two consultants reviewed the draft position paper. Dr. Michael R. White, Assistant Professor of Secondary Education and Curriculum, Michigan State University, attended the July 28-29 conference. On August 4, 1977, the principal investigator met with Dr. Rupert N. Evans, Professor of Vocational-Technical Education, on the University of Illinois campus.

On August 11, 1977, a meeting was held with Robert Balthaser and Robert B. Gates to review the progress of the project. The conference evaluation was discussed and future plans were considered.

Objective Two. During August and September, 1977, individual conferences were held with the Assistant Directors of the Division of Vocational Education, State of Ohio Department of Education. These meetings were held to determine program goals, scheduling, and staffing patterns.

On September 8, 1977, the Project Staff met with Dr. Byrl Shoemaker to discuss the progress of the project. Discussion centered on program goals. In addition, problems of staffing, scheduling, and financing were considered in detail.

On September 21, 1977 the principal investigator met with Robert B. Gates to plan two program presentations. The position paper was reviewed and plans for presentations to the OVA, in October, and to the AVA, in December, were made.

A presentation to the Ohio Vocational Association was made on October 7, 1977. Only 20 persons attended the session. Without exception, all in attendance were members of the Industrial Arts Division of the OVA.

On October 11, 1977, another state staff meeting was held with personnel from the Division of Vocational Education, State of Ohio Department of Education. The meeting considered program design and development questions. The agenda for the meeting and persons in attendance are reported in Appendix G.

The second general conference was held October 27-28, 1977. Thirteen participants were invited and twelve, plus project staff, attended. The program plan, as proposed, was considered during the

the two-day period. General topics discussed were activities, time allocations, staffing, facilities and equipment, and financing. The list of participants and the agenda are presented in Appendix H.

On November 4, 1977, the principal investigator visited the Pittsburgh, Pennsylvania school system. The well-publicized OVT middle/junior high school centers were visited and discussed with central office and school staff.

After a planning meeting with Robert B. Gates on November 17, 1977, a program was presented to the Industrial Arts Division of the AVA in Atlantic City, New Jersey on December 5, 1977. Approximately 115 persons were in attendance at the general session of the Industrial Arts Division of the AVA. Jack Ford substituted for Robert B. Gates because of Gates' illness.

On December 19, 1977, Jack Ford, Robert B. Gates, and the principal investigator met to detail out a funding plan for future phases of the program. Career development programs of the Division of Vocational Education, State of Ohio Department of Education, were used as models for a funding plan.

On December 29, 1977, the principal investigator met with Dr. Byrl Shoemaker to discuss the proposed program and funding patterns. At that meeting, a decision was made by the principal investigator to ask for a three-month no-cost extension of the project to work on more precise estimates of cost. Subsequently, an additional two-month no-cost extension was requested and granted. Hence, project activity continued through May 31, 1978.

Techniques of Evaluation of Objectives

The worth or value of the proposed rationale and plan for a practical arts program was determined by formative and summative evaluation techniques. Formative (in process) evaluation was conducted by the project staff on a day-to-day basis. In addition, the staff of the Division of Vocational Education, State of Ohio Department of Education, served as reviewers and evaluators at several points in the development of the rationale (Objective One) and again during the development of program plans (Objective Two).

Other "external evaluators" were asked to react to the products of this developmental project. Consultants were requested to perform evaluation functions together with their other substantive input. In addition, selected educators were invited to planned conferences where the rationale and plan were presented. They were asked to evaluate the rationale (at Conference #1) and the plan (at Conference #2).

The quality of the first conference was evaluated. The evaluation data are presented in Appendix I.

Detailed evaluations of the position paper were obtained from five persons: (1) Dr. Byrl Shoemaker; (2) Dr. Rupert N. Evans, University of Illinois; (3) Dr. Robert C. Harris, Research Associate, National Institute of Education; (4) Dr. Ronald Todd, New York University; and (5) Dr. Michael R. White, Michigan State University. Comments received from these reviewers were most valuable in modifying the position paper. Less detailed evaluations were received from several staff persons at The Ohio State University and from personnel at the National Center for Vocational Education.

An article describing the project, written by a feature editor, appeared in the Columbus Dispatch on January 9, 1978. Although the empirical value of limited reader reaction is open to question, the principal investigator received six letters from citizens in the reading area who were most positive about the goals of a broad practical arts program.

In addition, two school systems, Akron and Dayton, have contacted the principal investigator on several occasions requesting further information toward the end of testing such a program in their schools.

No formal means were used to seek audience reaction at the OVA and AVA conventions. Based upon informal reaction, the position paper and the ideas it contains were very well received, indeed. Approximately twenty requests for copies of the paper presented at the AVA were requested by mail, even though ample copies were available for distribution at the session.

A short news item appeared in the February, 1978 issue of the American Vocational Journal regarding the AVA presentation. The paper presented at the AVA, with modifications, has been published (Ray, 1978). These represent positive evaluations of the ideas presented.

The ultimate evaluation of the products of the project rests with personnel in the Division of Vocational Education, State of Ohio Department of Education. If the proposed program is valued, it will receive future consideration for additional developmental work.

Contribution to Education

The efforts of this developmental study could lead to the redesign of education at the junior high/middle school level in this

state and nation. Too often courses in industrial arts and/or home economics are considered to be only "enrichment" activities and not of central importance. A school program encompassing a pattern of critical life experiences that relate to agriculture, home and family living, health, industry, business and office, and distribution, could become an important center or core of the junior high/middle school curriculum.

A new school-wide practical arts program could make major contributions to the education of youth. Such a program could (1) develop life coping skills, (2) provide occupational orientation and exploration, (3) foster aesthetic-cultural appreciations, (4) promote wise consumer behavior, and (5) generate interest and skill in avocational/recreational activities. The practical arts deal with the economic realities of life. The program goals listed above can be fulfilled if theory is put into practice.

Objective One of this project was to develop a position paper. This 22-page paper is presented as Appendix J. It provides an underlying philosophy for a "process" oriented program of the practical arts. This statement makes a contribution by synthesizing early and current thinking regarding the practical arts.

Objective Two of the project was to provide a program plan to deliver a modern practical arts program. The general goals of each part of the program are presented in Appendix K. The subject matter generalizations are presented in Appendix L. These concepts, when internalized (at some level) by students, will result in life coping skills of a significant order. One major contribution of this project has been the identification of these generalizable life skills. From them instructional materials must be conceived and developed.

Projection of staffing needs for such a school-wide practical arts program is a difficult problem with which to deal. The required number of staff members needed will be a function of school size and the number of hours per week devoted to the program. Recommended minimum and optimum staffing patterns are provided in Appendix M.

Projection of program costs, both start-up and continuing, presents an equally difficult problem for program planners. Costs will vary by school size and minimum/optimum program installation. Hence cost projections are provided on a per-pupil basis and are based upon certain assumptions as to pupil-teacher ratio, number of pupils per grade level, and upon program duration by grade level. These cost figures are given in Appendix N.

The program structure and sequence are presented in the last sections of the position paper (Appendix J). If such a program can be implemented, it should make major contributions to the education of youth in grades seven to ten.

In order for this project to have made an impact on school practice, several next steps need to be taken in the immediate future. The following recommendations are made:

1. That planning monies be made available to develop a detailed practical arts curriculum guide, based upon generalized process skills identified by this study, for grades seven through ten.

2. That planning monies be made available to develop a set of guidelines entitled "Planning Guidelines for Funding."

3. That plans be made to support a limited number of practical arts programs in the State of Ohio in FY '80.

4. That the administration of these programs be placed with the State of Ohio Division of Vocational Education, Career Development Service.

5. That candidates for financial support be sought from school systems committed to career education.

6. That funding be given to those school systems that can demonstrate a commitment and can produce a plan for funding.

7. That funding be made available for programs in the 7th to 10th grades for 120-160 hours/year, 240-320 hours/year, and for 360-480 hours/year as described in the position paper.

8. That the funding formula be structured upon an appropriate dollar base for each level (7th-8th and 9th-10th) on a per-pupil basis.

9. That an attempt be made to evaluate the programs, especially the differential effects of minimum and optimum programs.

The program rationale, the program framework, and the staffing and funding patterns should be thoroughly evaluated by the staff of the Division of Vocational Education, State of Ohio Department of

Education. If they are deemed to be an adequate foundation upon which to build, the recommendations offered above should be considered, and if found appropriate, should be implemented at an early date through inclusion in the State Plan for Vocational Education.

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Appendix J

Project Position Paper

A SCHOOL-WIDE PRACTICAL ARTS PROGRAM

Introduction

Even during a period of time when lay people are calling for a "back-to-basics" movement, there is an urgent need for a basic, real-world education. This paper provides a rationale for and a program outline of a practical "process" education. It is proposed that all students, boys and girls, be required to enroll in a four-year block of practical arts programming in grades seven through ten. Such experiences would be in harmony with career education philosophy and career development psychology, but the goals of the practical arts transcend those of most career education offerings. Although career education objectives would direct much of the activity, economic and cultural literacy, consumer, worthy home-member, and avocational/leisure-time goals would be just as central as career goals. In short, a study of the practical arts would help youth cope with a very wide range of personal and societal problems that are the products of our fast-moving "real" world.

The Problem

Middle/junior high school programs are not adequately designed to assist youth to cope effectively with life problems. Classroom learning experiences have focused upon the major subject areas (disciplines) and preparation for advanced education. School programs and experiences seem to exist to prepare mostly for more schooling.

In recent years, reformers have called for a new perspective on schools and schooling. They propose to blend "conventional education" with "process education." Conventional education focuses upon the question "What must the individual know?" Process education focuses upon the question "What skills are essential to the individual in order to make him/her a more effective person?" H. P. Cole (1972) contends that skills are "...organizations of behaviors which are highly transferable" (pp. 3-4).

Bailey (1976) makes a strong case for both conventional and process education. He concludes that both "...approaches have much to recommend them and that a blend of both approaches is functionally required in instruction" (p. 41). This is not a new idea. Leaders in education have proposed and tried out new schemes of education over the years, but they have met with only limited success or less than full acceptance. The development of a practical arts component in the middle/junior high school would go far in the quest for the marriage of process and conventional education.

For decades the concept of a practical arts program has been in a near-dormant stage. Bonser (1920) was among the early leaders who expressed the need to develop school experiences, beginning in the elementary schools, that would bridge the gap between the academic (basic) school subjects and the many technical aspects of everyday life. Mays (1948) made a case for the development of the practical arts as strong support for general and vocational education programs. Roberts (1971) has traced the origins of practical arts education to the teachings of

Pestalozzi in Europe and to the manual training movement in the United States. Bailey (1976) has produced a "global paradigm" outlining a "process" approach to education with the ultimate purpose of preparing the "educated person." These examples not withstanding, however, the past fifty years of educational progress in the United States have been marked by an almost complete suspension of curriculum development activity which would have led to a broad-based practical arts component of schoolprograms.

Standing nearly alone have been the meritorious attempts of the professional leadership in home economics and industrial arts. But school experiences reflecting only the home and industry fall short of providing the broad program needed. Too often courses in industrial arts and/or home economics are considered to be only "enrichment" activities and not of central importance. By thoughtfully designing a pattern of critical life experiences that relate to agriculture, home and family living, health, industry, business and office, and distribution, a practical arts program could become an important center or core of the junior high/middle school curriculum.

A new practical arts program could make major contributions to the education of youth. Such a program could (1) develop life coping skills, (2) provide occupational orientation and exploration, (3) foster aesthetic-cultural appreciations, (4) promote wise consumer behavior, and (5) generate interest and skill in avocational/recreational activities.

The practical arts deal with the economic realities of life. The program goals listed above can be fulfilled if theory is put into

practice. Examples of classroom and laboratory (personal) experiences are numerous and varied. From agriculture, such activities as animal care, lawn and garden work, and a study of fertilizers and insecticides would qualify for consideration. Experiences in home management, foods and nutrition, and child care, for example, would be contributed through home economics. Health care would be studied through hands-on clinical activities dealing with eyesight, the cardiovascular system, and trauma situations. A study of industry would involve,among other things, shaping materials with tools and machines, forming an enterprise, designing and engineering a product, or maintairing products used in the home. Using credit wisely, saving and investing, and personal record keeping would be examples of business education knowledge and skills. Studies in wholesale and retail sales, advertising, and marketing practices are other examples of experience-centered learnings. Such personal experiences should be carefully related to important higher-order abstractions of use in all life roles.

Children in today's schools find much of their education remote from life and living. They have claimed that schooling is not relevant (NASSP, 1974). Much of what they do learn is done in learning environments nearly devoid of practical hands-on experience and motivating, exciting activity.

Elementary schools perhaps have done the best job of relating the basic experiences (instrumental skills) in language, number, and social consciousness to the real world. Junior high schools (or middle schools) have been caught up in the traditional pattern of preparing students to be able to perform in "academic subjects" commonly found at the high school and collegiate levels.

Youth must learn to cope with our complex technological society and culture. Central to this coping is experience with elements of economic life. The economic system must be thoroughly understood since such understanding will determine, in large measure, the following: (1) the student's pattern of education in secondary school, early post-secondary school, and throughout life; (2) what productive career will be chosen and pursued; (3) how effectively products and services will be utilized; (4) the nature and quality of life, including leisure-time activities; (5) what investments and savings will be accumulated; and (6) the character and quality of retirement years.

The problem, then, is that the schools have not adequately conceptualized and formalized a program where practical knowledge, coping skills, and values/attitudes can be developed that would enable students to find satisfaction in everyday life and meet the responsibilities of our fast-moving society. A practical arts program for early adolescents would provide both a broadening and a humanizing effect and would contribute to the development of individuals as whole persons.

The Practical Arts: Character of Past and Present Effects

The term "practical arts" entered upon the educational scene in the United States during the last two decades of the nineteenth century. It has been closely associated with industrial arts and home economics and their predecessors, manual training, manual arts, and domestic science since the 1880s. Manual training schools offered

courses in cooking, sewing, light carpentry, and clay modeling for girls and tool skills in woodworking and metalworking for boys (Roberts, 1971).

To trace "practical" education of mankind would be tantamount to tracing the history of mankind. There were many early efforts, even before the Christian Era, that related to training and education regarding tool making and use and the beginning of agriculture and an economic system. Handwork in schools for the common good (general education) has been traced to the work of Comenius, Basedow, and Pestalozzi as early as the 16th, 17th, and 18th centuries. Fundamental to their efforts was the axiom that sense impressions are the bases of thought and, hence, knowledge. Out of this point of view grew the idea of learning by doing. The object method of teaching and the recognition of the value of making something with the hands led to placing children in workshops where they engaged in handicrafts of several types (Bennett, 1926, p. 72).

Pestalozzi wished to put practical activities into "pedagogic form." He wrote:

> In endeavoring to impart to the child those practical abilities which every man stands in need of, we ought to follow essentially the same progress, as in the communication of knowledge, beginning from an alphabet of abilities, if I may so express myself, that is to say, from the simplest practical exercises, which being combined with each other, would serve to develop in the child a general fund of ability, to be applied to whatever purpose circumstances might render it necessary in after-life. Such an alphabet, however, has not yet been found, and that for the obvious reason, that it has not been sought for. I am not inclined to think that it would be very difficult to discover it, especially if the research were made with the same zeal, with which even the most trivial abilities connected with the operation of money-getting are attended to. If once discovered, it would be of essential benefit to mankind. (Bennett, 1926, p. 122)

The "learning by doing" idea was given impetus by John Dewey through experiments he and others conducted in the elementary school of the University of Chicago in the 1890s. Dewey considered the school a miniature society where the child came to experience and to gain an understanding of life, not a place for "the giving of lessons" (Brown, 1977, p. 11). Dewey's philosophy pervaded the progressive education efforts during the first half of this century.

Such 20th century movements as "progressive education," the "junior high school movement," the "activity movement," and "life adjustment education" provided a potentially fertile seedbed for the growth of industrial arts and home economics. These two practical arts fields have made remarkable progress in the middle/junior high school. To some extent business education has been and is offered at that level either as personal typing or "general business." Very little agriculture is taught in the middle/junior high school. Health education has made some inroads into school programs but, compared to home economics and industrial arts, it has not held a prominent position in the curriculum.

Over the years, these middle/junior high school programs have not received funding from Federal-Vocational monies, but their counterparts at the senior high, post-high school, and adult levels have. Thus, more specialized vocational programs have grown in number and importance, but their general education counterparts have grown and prospered only because of a strong general education commitment through general local and state funding sources.

Many local school systems have experimented with selected combinations of home economics, industrial arts, and business education, for example.

Two or all three of these subject areas combined have been called "practical arts" programs. Also, there is some history of "applied arts" or "unified arts" programs which involve some of the "practical arts" with the visual or performing arts in different combinations. A recent survey was made which identified over fifty unified arts programs in the United States (Ritz, 1975).

Regardless of these past and present efforts, most programs have been incomplete and not adequate to reflect the nature of our "practical world." Also, programs and activities have not been designed to focus upon the essential skills needed to cope with our rapidly changing world. A systematic treatment of the several practical arts fields should yield an innovative, comprehensive program that is built upon the "alphabet" that was so illusive to Pestalozzi and generations of pedagogues to follow.

Process Education: A Basis for a More Adequate Program

It is impossible to present any one set of universally accepted goals of schools and schooling. Although educators hold different points of view on basic questions regarding the means and ends of education, there seems to be a modicum of agreement that the creative rational powers of youth should be developed to prepare them for uncertainty and change. In this process, important skills must be developed. This has been stated by Rubin (1969):

> Since the procession of man's innovations is not likely to come to an end in the forseeable future, we have little choice but to base the education of youth on the expectation of uncertainty. Although the functions of men shift with the cultural revolution, their need for skill masterly does not decrease. Once-crucial motor skills, for example, have now become perhaps less important than the perceptual skills which enable a person to understand the world in which he lives (p. 1).

In the decade of the 1960s, a reaction against "conventional education" came about and has grown to a movement now known as "process education." The tenets of process education may provide the framework for a more adequate development of practical arts experiences in the curriculum.

According to Cole (1972), process education emphasizes the analytic, productive, and expressive-thinking skills. Rubin (1969) cites the cognitive skills, interactive skills, and creative skills, among others, as those central to effective life in the future. Cole states:

> ...process education places a primary importance upon the fostering of skills. Acquisition of bodies of knowledge and information or content is secondary. In process education, the key question in planning the curriculum or the lesson plan is, "What skills are essential to the individual in order to make him a more effective person?" The content of the curriculum is selected for its utility in the facilitation and exercise of those skills. The skills are the goals. The curriculum content is the vehicle by which the goal of skill development may be realized.
>
> Conventional education usually starts with the question, "What must the individual know?" The primary emphasis is upon the knowledge which is to be transmitted to the child. The concent, scope, and sequence of the educational experience assume primary importance. The development of skills is secondary to the mastery of bodies of knowledge or information. It is assumed that mastery of the prescribed content will result in skill development.(Cole, 1972, pp. 3-4)

It would seem that designers of school programs should consider the strong, essential points of each approach, as Bailey (1976) has suggested. Since, by definition, most educators have been involved in the "conventional" mode, and know its strong and weak features, more attention will be given here to the essentials of "process education."

Key to understanding the term "process education" are two words: process and skill. Process may be defined as a series of actions or operations

definitely conducing to an end. Process, in the educational context, would involve a series of actions (behaviors) directed toward goal achievement by the individual. Skills are organizations of behaviors which are highly transferable. They (skills) are behavioral control systems "...which incorporate, select, and direct different response patterns and attitudinal and behavioral tendencies and capabilities in a series of actions toward some goal" (Cole, 1972, p. 26).

Central to this discussion of process and skill is the idea that the learner must be active in the learning process, not passive. All actions must be internalized, or taken into the cognitive structure of the learner. Piaget refers to internalized actions as "operations" (Renner, et al., 1976, p. 17). Personal experience (practice in a wide variety of contexts) should be related to more abstract constructs. Each experience (first-hand perception) should be related to higher-order abstractions to optimize transfer of learning.

If the best aspects of conventional and process education are to be drawn upon, it seems clear that the two principal tasks are (1) to identify that body of knowledge (practical arts content) that may result in skill development and (2) to identify those skills that, when mastered, may give meaning to the knowledge base of the practical arts.

Skills: Fundamental to Living

At the most general level, the skills that are central to process education have been proposed. One set of five has been delineated by Meade (1969). They are "...the ability to reason; the ability to readjust oneself on one's own terms to cultural flux; the ability to control and spend one's time with

intelligence and rewarding purpose; the ability to achieve and sustain rewarding relationships with others; and the ability to persevere and extend one's uniqueness while participating harmoniously in the society" (p. 51).

Particular scholars, educators, and curriculum developers tend to list subsets of skills that relate to their subject or disciplinary specialty. The skills of the AAAS Science-A Process Approach include (among others) observing, classifying, measuring, communicating, inferring, predicting, formulating hypothesis, and interpreting data (Livermore, 1964).

Are there skills in the practical arts that are in harmony with Meade's set of skills (above) and that are fundamental to living and of critical importance to educating for uncertainty and change? These skills would certainly be "practical"; however, the so-called practical fields of study have come under some criticism.

Robert M. Hutchins (1968) has raised a question regarding "practical education":

> The most obvious fact about society is that the more technological it is the more rapidly it will change. It follows that in an advanced technological society futility dogs the footsteps of those who try to prepare the child for any precise set of conditions. Hence the most impractical education is the one that looks most practical, and the one that is most practical in fact is the one that is commonly regarded as remote from reality, one dedicated to the comprehension of theory and principles (p. 2).

A similar position has been stated by Moore (1967):

> Nothing is less practical than a practical education if the result is a trained incapacity for adaptation to change, or continuous learning, and for some degree of creativity. The school will fulfill its function as an agency of developmental change only if it prepares its graduates for a somewhat uncertain world, where no niche is absolutely secure and few niches even hold their shape well (p. 85).

If one agrees with the argument that schools exist to teach the most essential skills, surely the instrumental skills of reading, writing, speaking, listening, and computing are at or near the top of any list. But are the other skills of prime importance related only to the "academic" subjects of language, mathematics, science, and social science?

It is the position of this paper that there are skills (organizations of behaviors which are highly transferable) that may be identified, codified or structured, and used to develop curriculum materials and plan learning experiences in the practical arts fields. Such skills are not the specific ones which lead to trained incapacity for adaptation or change. They are not the ones which limit continuous learning or which stifle creativity. The practical arts disciplines do have concepts and principles which may be identified and placed into hierarchial, theoretical frameworks and which are generalizable to critical life problems. Such skills learned through experience today will help youth cope with their problems tomorrow.

Technology: Content as Process

A practical arts program should draw upon the best aspects of "conventional" and "process" educational philosophy. This implies, at the very least, that a list of the processes or "practical" skills (organizations of behaviors which are highly transferable) considered essential to the development of the "educated person," together with a list of the concepts, principles, and generalizations (abstractions) of the practical arts fields (what the learner ought to know), be outlined in some detail.

Several curriculum theorists have recognized that certain subject matter (content) has the characteristics of process (action). This has been discussed by Parker and Rubin (1966), DeVore (1970), Lux and Ray (1970), and Halfin (1973). Such content has been termed "technology" or "praxiology." Praxiology has been defined as the "science of efficient action" (Kotarbinski, 1965).

Because technology may be equated with praxiology (Towers, Lux, Ray, 1966), and the former term is more universally used (yet often misunderstood), the world "technology" is recommended to be used to describe the knowledge base of the practical arts fields. The task remains to codify the concepts of technology that would be representative of the practical arts fields under consideration.

Technology has a profound impact on people. In fact, it is feared and scathed by many persons, especially the humanists. Technology must be understood, assessed, and controlled; however, this can <u>not</u> be accomplished on a wide-scale basis without educating the populace about its nature. One would think that a study of the subject would receive great recognition in school programs, but it is the very area that is receiving the least recognition in the common school. According to Tomazic (1975), "...man exists independent of reason--but his existence is threatened unless his reason is brought to bear on his existence. ...man's knowledge grows out of his experiences and upon his introspection related to his experiences" (p. 92).

As man's early technology evolved, the youth of the time were able to observe (vicariously experience) technological processes first hand. In our complex, compartmentalized society of the 1970s and 1980s, most of this

important dimension of life is hidden and remote. The schools should assume the responsibility of systematically treating the technologies (providing first-hand learning experiences) as represented in the practical arts subject areas. An attempt to operationalize and evaluate one unit of study was reported by Rahkola (1974).

Codifying the Concepts of Technology

According to Gagné (1968), the identification of the process hierarchy from the simple, concrete, and specific to the complex, abstract, and general activities of the discipline provides a solution to the development of instructional units and the sequencing of instruction. The source of the process hierarchy has been identified by DeVore (1970). "The processes to be identified will be based upon the activities of the practitioners in the discipline. Programs are, therefore, performance and behaviorally oriented as in technology" (p. 28).

The term "technology" is often thought to be restricted in meaning to considerations of hardware or mechanical things. It has a much broader meaning. Technology encompasses the total spectrum of the knowledge of efficient human behavior. Technology is the product of the organized, disciplined study of the practices of man. It has to do with all of the practices which ultimately affect individual and social human behavior. The concepts of technology are "ing" words, gerunds, or verbal nouns. Each concept connotes action.

Halfin (1973) identified seventeen "processes" that characterize the "skills" of the technologist: (1) defining the problem operationally,

(2) observing, (3) analyzing, (4) visualizing, (5) computing, (6) communicating, (7) measuring, (8) predicting, (9) questioning or hypothesizing, (10) interpreting data, (11) constructing models or prototypes, (12) experimenting, (13) testing, (14) designing, (15) modeling, (16) creating, and (17) managing (p. 202). These parallel closely the "processes" of science, but there are unique differences. These concepts, plus others that relate more specifically to each practical arts field, would make up the list of higher-order concepts to be mastered through personal experience and intellectualization.

The problem of codifying or classifying technological concepts into a hierarchy of concepts is a critical one. Higher-order concepts are more abstract, complex, or theoretical. Lower-order concepts in a hirarchy are more simple, concrete, and specific. Lower-order concepts can be directly experienced through personal activity. Higher-order abstractions are the product of intellectual processing. Higher-order concepts relate to the life skills emphasized by the philosophy of "process education."

Concepts, as such, are not taught directly. They serve as instruments for a framework, with which facts, ideas, generalizations, and values are structured and organized. Once the conceptual framework is internalized, the potential for transfer of learning is enhanced.

What follows is an attempt to list industrial concepts (abstractions) which may be developed through first-hand personal experience. The general approach is adapted from a plan in use with family-focused home economics programs for the public schools of Wisconsin (Stoner, 1977). Using a scheme such as that presented in Figure 1, the curriculum developer would design classroom and laboratory learning experiences which would provide the "ownership"

Figure 1

School Experiences That Will Result in Life Skills
in the Area of Industry

	Study of the Past	Analysis of Current Transormation Processes	Assessment of Future Alternatives
Personal Experiences (School and Out-of-School)	Early Tools/Machines Energy/Power Communication/ Transportation (Others)	 Designing a dream home Maintaining a bicycle Forming materials with tools and machines Engineering a production system Enterprise simulation (Others)	Future Energy Sources Housing Solutions Recycling Processes Space Manufacturing (Others)

Abstractions				
	Transforming	Maintaining	Constructing Prototype	Supplying
	Producing	Repairing	Experimenting	Controlling
	Pre-Processing	Altering	Testing	Directing
	Receiving	Defining Problems	Modeling	Monitoring
	Handling	Observing	Decision Making	Reporting
	Unpackaging	Analyzing	Managing	Correcting
	Storing	Visualing	Planning	Utilizing Personnel
	Protecting	Computing	Formulating	Hiring
	Processing	Communicating	Researching	Training
	Forming	Measuring	Designing	Working
	Separating	Predicting	Engineering	Advancing
	Combining	Hypothesizing	Organizing	Retiring
	Post-Processing	Interpreting Data	Structuring	
	Installing			

(Hauenstein, 1972) of these important abstractions on the part of each learner. By developing an ownership of the concepts (being placed in the cognitive structure), it is assumed that the higher-order skills would be utilized in many life situations and roles. The high-order concept of "transformation" (Land, 1973) holds much promise for the development of practical arts programs.

Practical Arts Program Elements

Of course, all school subjects have their practical dimensions. But it would be difficult to make a case that language, mathematics, science, and social studies courses make up elements of the "practical arts" field. It is just as difficult to argue that art, music, and physical education are "academic" fields. Therefore the fine and performing arts are closely related to the practical arts, but they are normally not considered to be "practical arts."

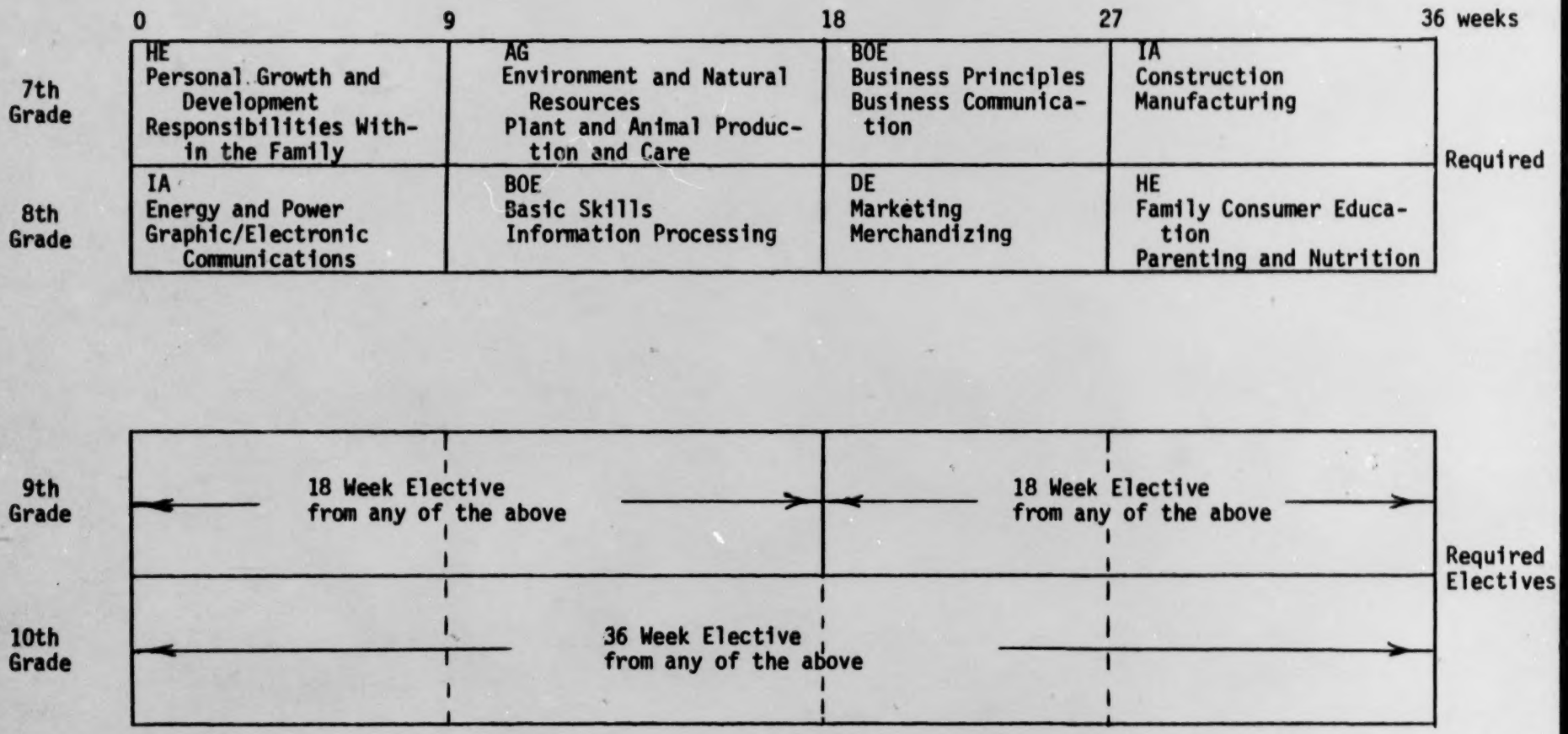
All school subjects listed above can make contributions to technological abstractions. To the extent possible, teachers of all subjects should be encouraged to do so. The program design presented here, however, is school-wide only in the sense that all children, boys and girls, should be required to enroll in classes in the fields of agriculture, business/distribution, home/family living/health, and industry.

Figure 2 presents a blocking of the program elements. Each and every student in school would be required to rotate through the eight nine-week courses during the seventh and eighth grades.

More flexibility would be permitted at the ninth and tenth grade levels. Each student in school would be required to elect two full years of study, but such study could be in quarter (nine week), semester, or full-year courses.

Figure 2

Program Element Blocking
(Example for One Student)



Program Administration

Two principal administrative considerations of importance to such a practical arts program are scheduling and staffing. Several other problems, including housing and financing, are not discussed here in any detail.

Time allotments and scheduling are extremely important. In the past five years, attempts at compliance with Title IX of the Education Amendments of 1972 (Prohibition of Sex Discrimination) have eroded the time available to students in home economics and industrial arts, the most common practical arts offerings. The program proposed here will need a much larger time allotment than that made available in most school systems. In the seventh and eighth grades,a minimum of 120 hours per year would be needed (one class period per day, five days a week, or the equivalent, for the entire year). School systems should be encouraged to experiment with time allotments and scheduling which approach 360 hours per year for classes in the practical arts at this school level. In the ninth and tenth grades, 150 to 480 hours per year should be set aside for practical arts coursework for all boys and girls.

Since all students would be enrolled in these classes, at least one-ninth to one-seventh of the total professional school staff would be needed to teach the program under the minimum 120 hour pattern and the 160 hour pattern, respectively. At the optimum (or higher end) of the time allotments, about 33 percent to 45 percent of the total school faculty would be required to staff the practical arts department to deliver 360 and 480 hours per year of instruction, respectively. The minimum time allotment (and needed staffing) may be difficult to attain. The optimum programming may be unrealistic at this point in time.

The qualifications of the practical arts staff would include the appropriate certification and experience in home economics, industrial arts, business/distributive education, and agricultural education. There will be a need for in-service staff development programs to assist teachers as they work with these broad-based programs.

Schools vary in size from small to large. Each school situation will present unique scheduling and staffing problems. At the very least, schools should move to install the minimum program outlined above. Practical arts programs of optimum proportion should be considered under experimental conditions.

The program would need extensive classroom and laboratory facilities. Each school situation (number of students, teacher stations, etc.) would need to be studied to determine the number and size of instructional spaces required to operate the program.

Under the provisions of PL 94-482, and if included in the State Plan for Vocational Education, this program would qualify for funding. The least that can and should be done is to create detailed plans, adopt or adapt curriculum materials, and place the program in operation in pilot centers in selected secondary schools.

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Appendix K

Program Objectives By Area

AGRICULTURE

Students should have the ability to...

1. identify garden tools and machines used in agriculture, and be able to safely use the more common and simple ones.
2. care for home lawns and gardens.
3. intelligently choose and safely use common chemical agents.
4. understand the basic science of plant life.
5. care for small animals.
6. understand the relationship between agriculture and our basic economy.
7. understand the natural resources can be depleted, conserved, and regenerated.
8. understand the substances in and chemical nature of soil.
9. identify and describe several occupations in the field of agriculture.

BUSINESS

Students should have the ability to...

1. make intelligent decisions as a consumer based on general knowledge.
2. understand the legalities involved in having a credit card and the responsibilities associated with using it.
3. prepare a budget reflecting their own needs and proposed income.
4. use general principles of business mathematics including figuring interest charges and reading a mortgage chart.
5. answer the telephone and take a message communicating clear and correct information.
6. write a business letter, using an acceptable format.
7. keep personal records accurately.
8. understand simple investments, e.g., saving bonds, savings certificates, deposits, etc.
9. understand insurance and liability and other types of protection for personal belonging.
10. identify and describe several general occupations areas in the business world.
11. complete surveys of business problems to determine general knowledge and understanding of decision making processes.
12. classify or categorize data, attaching values given each item. (To determine personal vs. business values and priorities.)
13. study behavior of people as: individuals, as small families, as groups large and small and with authority or a form of business organization.

DISTRIBUTION

Students should have the ability to:

1. understand the role of marketing and distribution in our economy.

2. identify and describe several occupations in the field of marketing and distribution available in the local community.

3. understand the differences between tangible and intangible goods and services available in the field of distribution.

4. recognize the differences between hourly and salaried personnel in distribution and those who work for a commission.

5. acquire knowledge about the different educational requirements necessary for various marketing and distribution occupations.

6. develop skills in securing, reviewing and evaluating information for various occupations in marketing and distribution.

7. understand simple concepts in wholesaling and retailing.

8. recognize the effects of advertising on our thinking.

9. identify the basic facets of distribution utilized in getting common materials, in their raw form, from their point of origin to the point of consumer use. Common materials would include oil, metals, woods, fabrics, and food stuffs.

HOME AND FAMILY

Students should have the ability to...

1. assist in making a home environment, one which satisfies personal needs, physical needs, emotional needs, and human development for the whole family.

2. realize the need of sharing space in the home, sharing care of home and sharing safety responsibilities to make a house a home.

3. develop an appreciation for personal and family possessions and skills necessary to maintain these possessions in an operable manner.

4. understand the responsibilities of parenting.

5. understand the consequences of venereal disease and how to avoid such disease.

6. analyze personal daily food-selection as it relates to healthy body needs, maintaining of body weight and forming good eating patterns for the rest of their life.

7. learn simple techniques and be knowledgeable of food principles involved in preparing simple nutritional meals.

8. manage their resources such as time and equipment in the laboratory and at home.

9. generally be a knowledgeable consumer.

10. recognize personal and social problems that can develop from improper use of drugs, alcohol and tabacco.

11. understand body functions and emotional stability in normal peer relationships as they prepare for adult living.

12. develop good grooming habits.

13. plan, maintain, and repair their own wardrobe.

14. understand family finances and budgeting to meet individual needs within the family.

15. develop an understanding of personal and inter-personal relationships needed in adjusting to present environment at school, at home, and in the community.

INDUSTRY

Students should have the ability to...

1. understand how the labor market operates, including the concepts of the role of organized labor, unemployment, market trends, and emerging occupations.

2. understand the relationship between the growth of industry and the development of our country.

3. intelligently and efficiently choose from the variety of goods and services inherent in a market-driven economy.

4. appreciate the value of design in a product.

5. choose the proper material for a job.

6. safely, effectively, and efficiently use, operate, and maintain industrial goods such as washing machines, cars, homes, etc.

7. troubleshoot simple household electromechanical products.

8. maintain the interior and exterior of a home.

9. show a working knowledge of tools and materials so as to maximize leisure time, (constructive and productive) activity.

10. show the proper use of basic tools and be able to maintain them.

11. choose leisure activities with a background that includes at least a brief orientation to the more common ones, including woodworking, leather, jewelry, etc.

12. show a general awareness by being an informed citizen in an industrial society. This would include a knowledge of zoning laws, environmental concerns, etc.

13. understand the influence of industry on the environment.

14. understand industrial occupations through realistic personal experience.

15. work as a team member to produce a final product.

16. understand the differences between skilled and unskilled labor.

17. understand the differences between continuous, intermittent, and custom production.

Appendix L

Subject Matter Generalizations

School Experiences That Will Result in Life Skills
in the Area of Agriculture

	Study of the Past	Analysis of Presently Available Transformation Processes		Assessment of Future Alternatives
Personal Experiences (School and Out-of-School)	(to be designed)	Growing Plants and Turf Caring for Animals Applying Fertilizers Record Keeping Using Equipment Safely Enterprise Simulation (Others to be designed)		(to be designed)
Abstractions	Transforming Producing Breeding Husbandry Slaughtering Seeding Planting Cultivating Harvesting Fertilizing Applying Herbicides Applying Pesticides Mining Drilling	Processing Forming Separating Combining Managing Planning Organizing Controlling Directing Monitoring Reporting Correcting Storing	Marketing Budgeting Investing Borrowing Decision Making Record Keeping Defining Problems Observing Analyzing Visualizing Computing Communicating Measuring	Predicting Hypothesizing Interpreting Data Experimenting Testing Designing Modeling Creating

School Experiences That Will Result in Life Skills
in the Area of Business and Distribution

	Study of the Past	Analysis of Presently Available Transformation Processes		Assessment of Future Alternatives
Personal Experiences (School and Out-of-School)	(to be designed)	Personal Record Keeping Budgeting Analysis of Advertising Selecting Marketing Plans Enterprise Simulation (Others to be designed)		(to be designed)
Abstractions	Transforming Producing Processing Recording Storing Filing Sorting Retrieving Summarizing Classifying Communicating Duplicating Encoding Decoding	Selling Servicing Advertising Marketing Transporting Staffing Managing Decision Making Budgeting Investing Borrowing Financing Receiving	Delivering Billing Loading Packaging Hiring Training Working Advancing Retiring Planning Organizing Controlling Directing	Monitoring Reporting Correcting Defining Problems Observing Measuring Predicting Hypothesizing Interpreting Data Experimenting Testing

School Experiences That Will Result in Life Skills
in the Area of Health

	Study of the Past	Analyzing of Presently Available Transformation Processes		Assessment of Future Alternatives
Personal Experiences (School and Out-of-School)	(to be designed)	Examining and Diagnosing the Eye Simulating Trauma Situations Studying X-Rays Blood Typing and Pressure (Others to be designed)		(to be designed)
Abstractions	Transforming Growing Developing Interacting Preventing Rehabilitating Helping Caring Examining Detecting Diagnosing Prescribing Treating Exercising	Providing Therapy Creating Moods Decision Making Managing Planning Organizing Controlling Directing Monitoring Reporting Correcting Educating Protecting	Sanitizing Informing Valuing Utilizing Assimilating Procreating Emancipating Dying Body Functioning Aging Maturing Status Defining Transforming	Defining Problems Observing Analyzing Visualizing Computing Communicating Measuring Predicting Hypothesizing Interpreting Data Experimenting Testing Modeling

School Experiences That Will Result in Life Skills
in the Area of Home and Family Living

	Study of the Past	Analysis of Presently Available Transformation Processes		Assessment of Future Alternatives
Personal Experiences (School and Out-of-School)	(to be designed)	Testing Product Safety Role Playing Family Situations Planning for Marriage Preparing a Budget Selecting Foods, Fabrics, Housing Enterprise Simulation (Others to be designed)		(to be designed)
Abstractions	Transforming Managing Planning Formulating Designing Developing Organizing Structuring Supplying Controlling Directing Monitoring Reporting Correcting	Decision Making Educating Socializing Maturing Grooming Selecting Producing Consuming Utilizing Conserving Parenting Buying Budgeting	Financing Processing Forming Separating Combining Valuing Maintaining Servicing Creating Emancipating Housing Defining Problems Observing	Analyzing Visualizing Computing Communicating Measuring Predicting Hypothesizing Interpreting Data Constructing Prototype Experimenting Testing Designing Modeling

70

School Experiences That Will Result in Life Skills
in the Area of Industry

	Study of the Past	Analysis of Presently Available Transformation Processes		Assessment of Future Alternatives
Personal Experiences (School and Out-of-School)	(to be designed)	Designing a Dream Home Maintaining a Bicycle Working Safely with Tools and Machines Engineering a Production System Enterprise Simulation (Others to be designed)		(to be designed)
Abstractions	Transforming Producing Pre-Processing Receiving Handling Unpackaging Storing Protecting Processing Forming Separating Combining Post-Processing Installing	Maintaining Repairing Altering Defining Problems Observing Analyzing Visualing Computing Communicating Measuring Predicting Hypothesizing Interpreting Data	Constructing Prototype Experimenting Testing Modeling Decision Making Managing Planning Formulating Researching Designing Engineering Organizing Structuring	Supplying Controlling Directing Monitoring Reporting Correcting Utilizing Personnel Hiring Training Working Advancing Retiring

71

Appendix M

Minimum and Optimum Staffing Patterns

MINIMUM TEACHERS PER GRADE
(Based Upon 120/160 Hours Per Year)

Pupil/Teacher Ratio = 20:1

7th or 8th Grade
(120 Hrs.)

Pupils/Grade	Teachers* PA	Other	Total
100	.8	6.2	7
200	1.6	12.4	14
300	2.3	18.7	21
400	3.1	24.9	28
500	3.9	31.1	35
600	4.7	37.3	42

9th or 10th Grade
(160 Hrs.)

Pupils/Grade	Teachers PA	Other	Total
100	1	6	7
200	2	12	14
300	3	18	21
400	4	24	28
500	5	30	35
600	6	36	42

Pupil/Teacher Ratio = 25:1

7th or 8th Grade
(120 Hrs.)

Pupils/Grade	Teachers PA	Other	Total
100	.6	5.4	6
200	1.2	9.8	11
300	1.9	15.1	17
400	2.5	19.5	22
500	3.1	24.9	28
600	3.7	30.3	34

9th or 10th Grade
(160 Hrs.)

Pupils/Grade	Teachers PA	Other	Total
100	.8	5.2	6
200	1.6	9.4	11
300	2.4	14.6	17
400	3.2	18.8	22
500	4	24	28
600	4.8	29.2	34

* # of teachers needed to service one grade

Assumptions
Each student attends school 6 hours/day, 1080 hours/year
Teacher contact hours approximately 4.3 hours/day

OPTIMUM TEACHERS PER GRADE
(Based Upon 360/480 Hours Per Year)

Pupil Teacher Ratio = 20:1

7th or 8th Grade
(360 Hrs.)

Pupils/Grade	Teachers* PA	Other	Total
100	2.3	4.7	7
200	4.7	9.3	14
300	7	14	21
400	9.3	18.7	28
500	11.7	23.3	35
600	14	28	42

9th or 10th Grade
(480 Hrs.)

Pupils/Grade	Teachers PA	Other	Total
100	3	4	7
200	6	8	14
300	9	12	21
400	12	16	28
500	15	20	35
600	18	24	42

Pupil Teacher Ratio = 25:1

7th or 8th Grade
(360 Hrs.)

Pupils/Grade	Teachers PA	Other	Total
100	1.9	4.1	6
200	3.7	7.3	11
300	5.6	11.4	17
400	7.5	14.5	22
500	9.3	18.7	28
600	11.2	22.8	34

9th or 10th Grade
(480 Hrs.)

Pupils/Grade	Teachers PA	Other	Total
100	2.4	3.6	6
200	4.8	6.2	11
300	7.2	9.8	17
400	9.6	12.4	22
500	12	16	28
600	14.4	19.6	34

* # of teachers needed to service one grade.

Assumptions
Each student attends school 6 hours/day 1080 hours/year
Teacher contact hours approximately 4.3 hours/day

Appendix N

Program Estimated Costs

Estimates of Per-Pupil Costs
7th-8th Grades

(Assumptions: Minimum program; Pupil-teacher ratio 25:1; 400 pupils/grade)

1.	Teacher's salaries (50% - $12,000) 2.5 x .5 x $12,000	$15,000
2.	Equipment @ $10/pupil/year two-year start up (assumption of two areas in existence)	$ 4,000
3.	Instructional Supplies $6/pupil/year	$ 2,400
4.	Instructional Materials $6/pupil/year	$ 2,400
5.	Transportation $2/pupil/year	$ 800
6.	Coordination .5 x $14,000	$ 7,000
7.	In-Service 10% of budget above	$ 3,200
		$34,800
		for 400 pupils
		= $87/pupil

Summary estimate of cost/pupil:

One period per day program:	$ 90/pupil
Two periods per day program:	$180/pupil
Three periods per day program:	$270/pupil

Estimates of Per-Pupil Costs
9th-10th Grades

(Assumptions: Minimum program; Pupil-teacher ratio 25:1; 400 pupils/grade)

1.	Teacher's Salaries (50% - $12,000) 3.2 x .5 x $12,000	$19,200
2.	Equipment @ $12/pupil two-year start up (assumption of two areas in existence)	$ 4,800
3.	Instructional Supplies $8/pupil/year	$ 3,200
4.	Instructional Materials $6/pupil/year	$ 2,400
5.	Transportation $4/pupil/year	$ 1,600
6.	Coordination .65 x $14,000	$ 9,100
7.	In-Service 10% of budget above	$ 4,100
		$44,400
		for 400 pupils
		= $111/pupil

Summary estimates of cost/pupil:

One period per day program:	$115/pupil
Two periods per day program:	$230/pupil
Three periods per day program:	$345/pupil

Equipment Cost Estimates* By Area
7th and 8th Grades

Home Economics Education	$ 12,000/space
Industrial Arts Education	$ 20,000/space
Business and Office Education	$ 20,000/space
Agricultural Education	$ 20,000/space
Distributive Education	$ 9,000/space

9th and 10th Grades

Home Economics Education	$ 30,000/space
Industrial Arts Education	$ 30,000/space
Business and Office Education	$ 25,000/space
Agricultural Education	$ 30,000/space
Distributive Education	$ 15,000/space

*based upon 1977 costs--should be adjusted 6-8 percent per year to allow for inflation--cost estimates based upon assumption of no present facility.